Hydrogen in Fort Collins, CO

Gary Schroeder
Fort Collins Utilities

CWADE
April 14, 2004

Hydrogen in Fort Collins

- September, 2000: *Forum on Converting to a Hydrogen Economy – HydrogenNow!*
- January 2001: City Hydrogen Task Force (HTF) formed
- March 2002: Resolution approved by Council
- October 2003: Report of status and recommendations submitted to Council

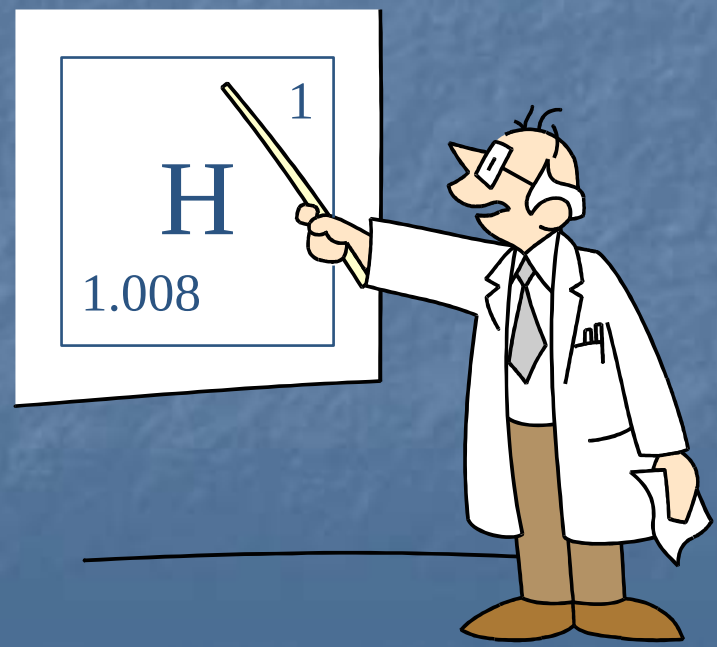
Recent Activity

- Electrolyzer and Hythane® Fueling – City / OEMC project
- Frontline Bioenergy
- Avalence Electrolyzer Demo
- Grants

Hydrogen from Biomass?

Recommendations: Education

- Public school curriculum
- Public education events
- Tours
- Web site




JIM BORGMAN: CINCINNATI ENQUIRER © 2003
NATURALLY, OUR PROTOTYPE FOR THE HYDROGEN CAR STILL HAS SOME BUGS TO WORK OUT...

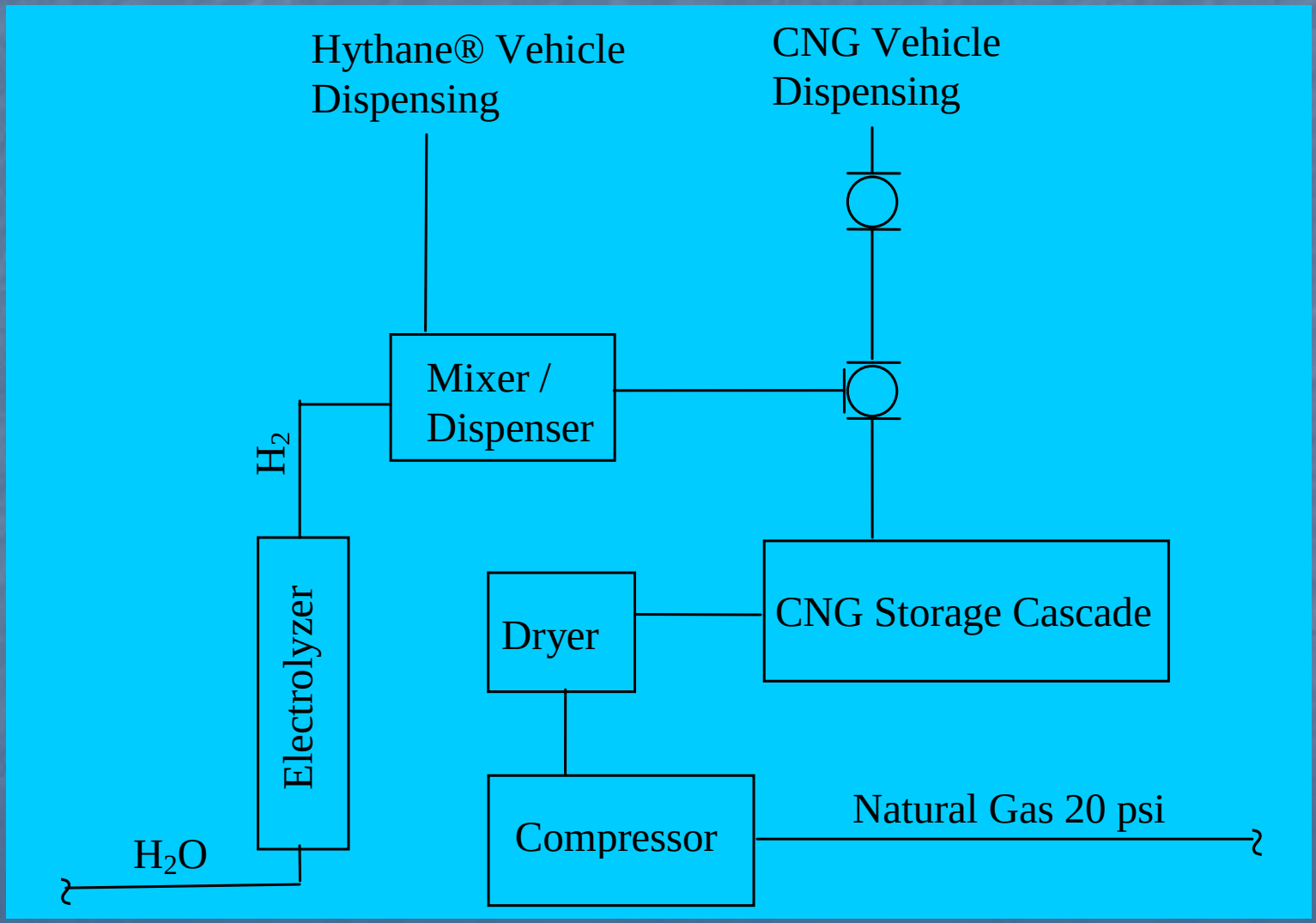
Hythane® Advantages

- Can use OEM CNG vehicles
- Relatively low fueling infrastructure cost
- 40%-50% reduction in emissions with 15% by volume hydrogen
- Leverage – lower emissions with given amount of H_2
- Opportunity to educate safety officials with an easy gradient

Vehicle Fueling Project

- Phase I - Electrolyzer / Hythane® project
  - Start with one mini bus
  - Compare emissions with CNG bus
  - Expand up to 5 mini buses + Fleet vehicle
- Phase II – Add pure H_2 dispensing
  - Acquire pure H_2 vehicle (Hybrid)

Hythane® / CNG Facility



Avalence Electrolyzer

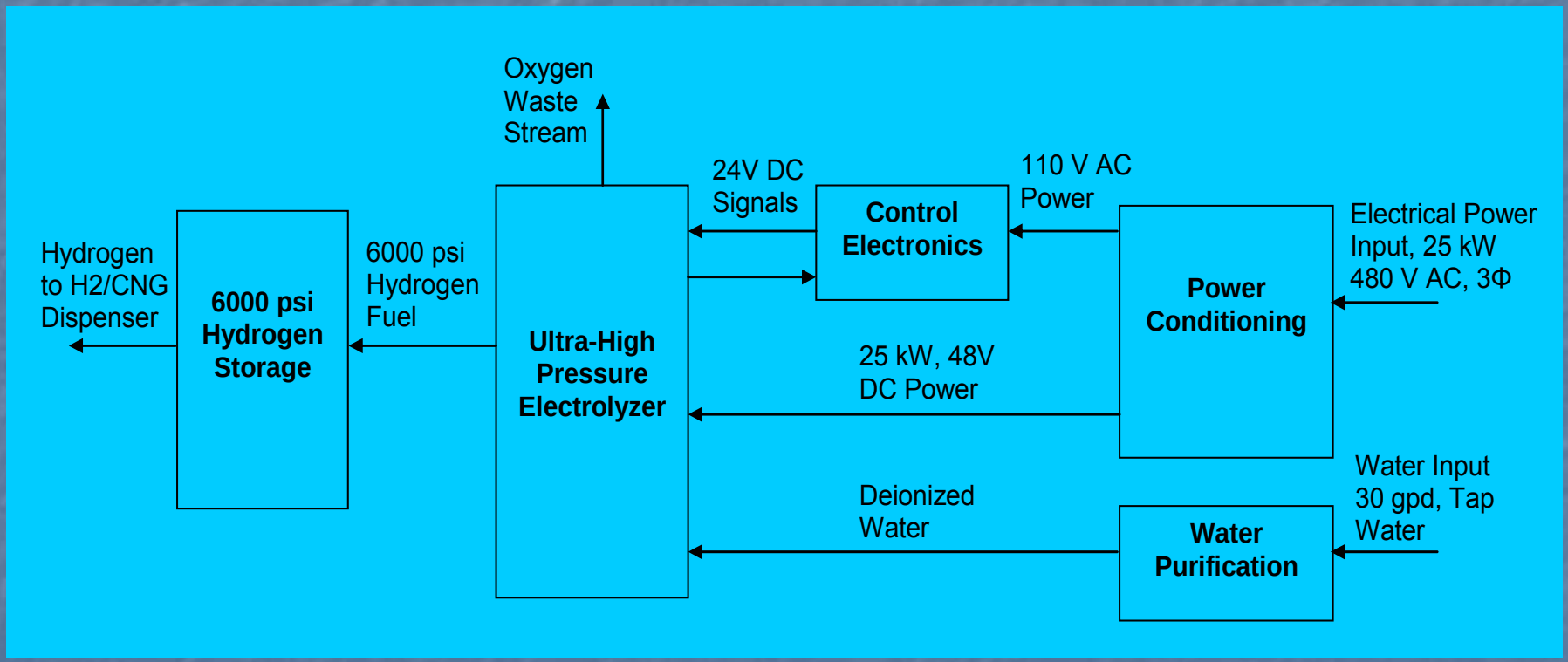
- Hydrofiller 175 – 6000G
  - 175 scfh production (25 kW Input Power) ~0.4 kg/h
  - 6000 psi
  - Grid Input Power (480V, 3 Phase)
- Delivery in August 2004

Hydrofiller 175

City of Fort Collins

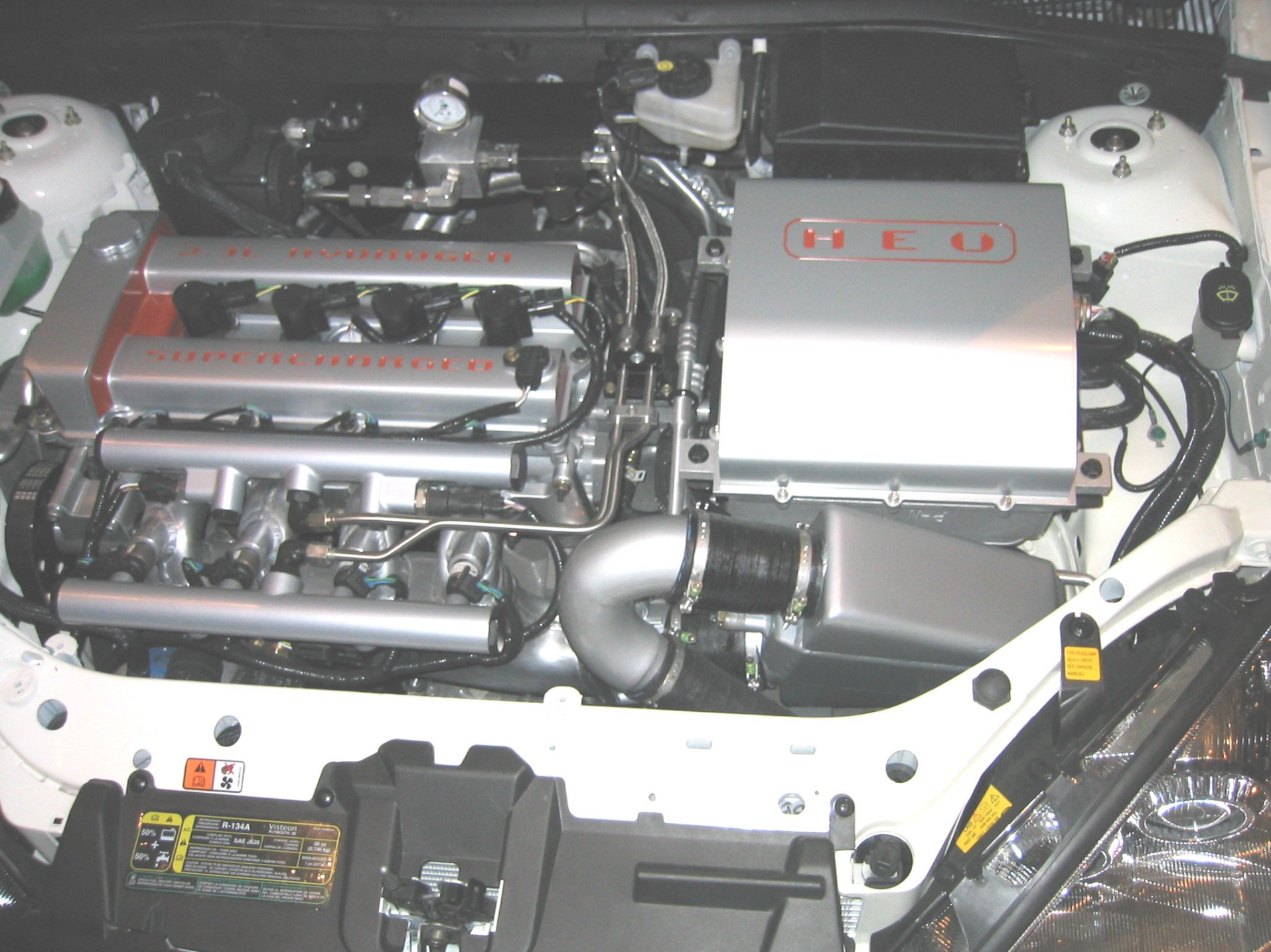
olorado
Governor's Office of Energy
Management and Conservation

Avalence Electrolyzer

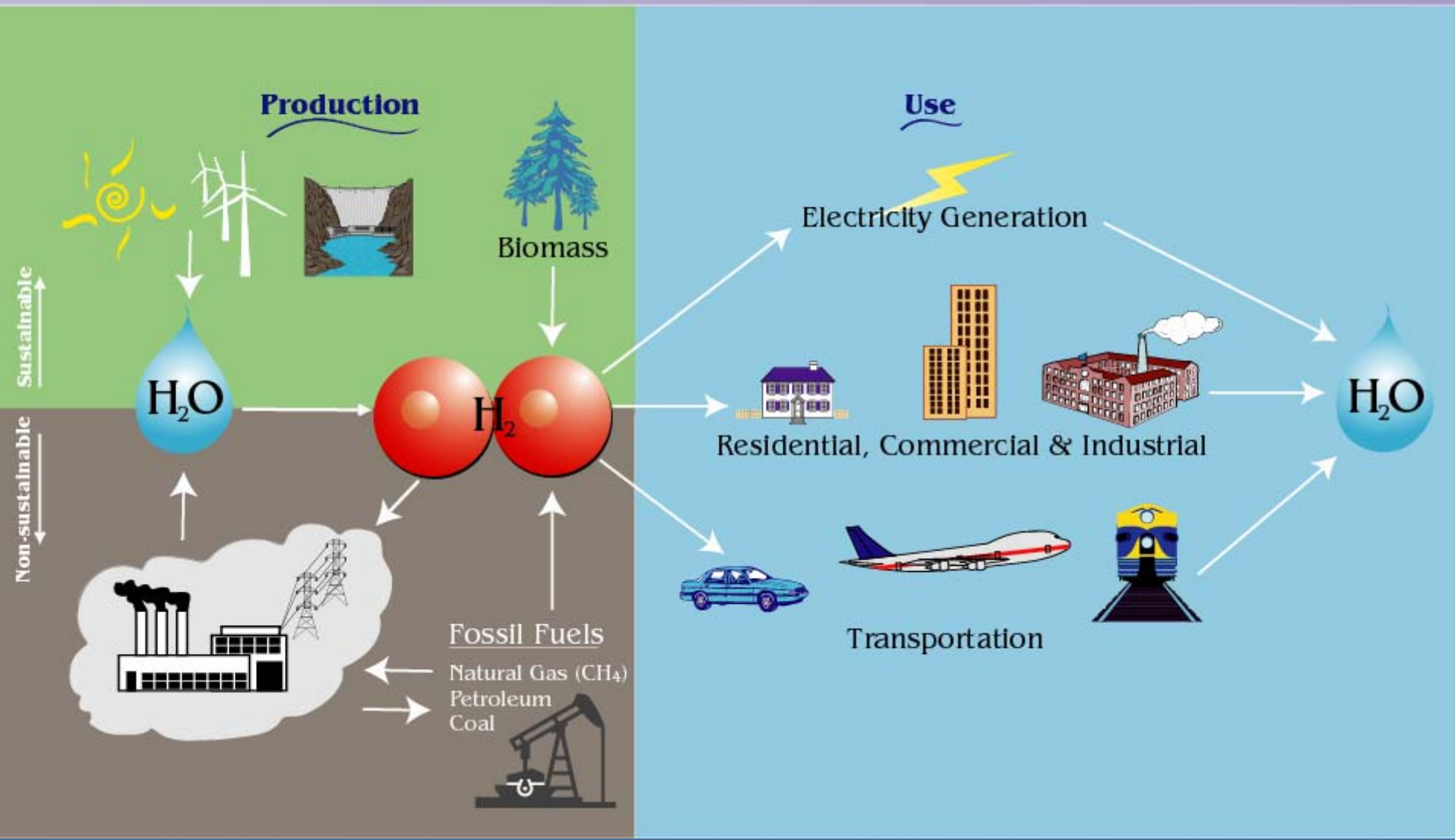



Dial-A-Ride
757·HSJ


H2RV
HYDROGEN ICE HYBRID RESEARCH VEHICLE


2.3L HYDROGEN
SUPERCHARGED
H E U
R-134A
Visteon

Hydrogen: The Big Picture




STEP ON THE
HYDROGEN

Report of the City of Fort Collins Hydrogen Task Force

www.fcgov.com/utilities/htf.php

Gary Schroeder
gschroeder@fcgov.com
970-221-6395


WATER VAPOUR OUT
HYDROGEN FUEL
ELECTRICAL POWER
BALLARD FUEL CELLS
BALLARD FUEL CELLS
1029204
Fuel Cell Engine by XCELLSIS
Stuart
SunLine
HYTHANE

Electrolyzer

Electrolyzer

Reformer


hydrogen station
fueling the future!
PRAXAIR
AIR PRODUCTS


HONDA
FCX V3


Fuel Cell
Brennstoffzelle
Pile à combustible


DEMIO
FCEV


necar3
necar3


TOYOTA
FCHV-4
FUEL CELL HYBRID VEHICLE


Ford
DyneCell - Advanced Fuel Storage Systems
PROTOTYPE
HYDROGEN FUEL ONLY
DO NOT USE AFTER 11/2003
DYNETEK INDUSTRIES LTD.
XCELLSIS
powered by
THINK
hydrogen fuel cell electric vehicle

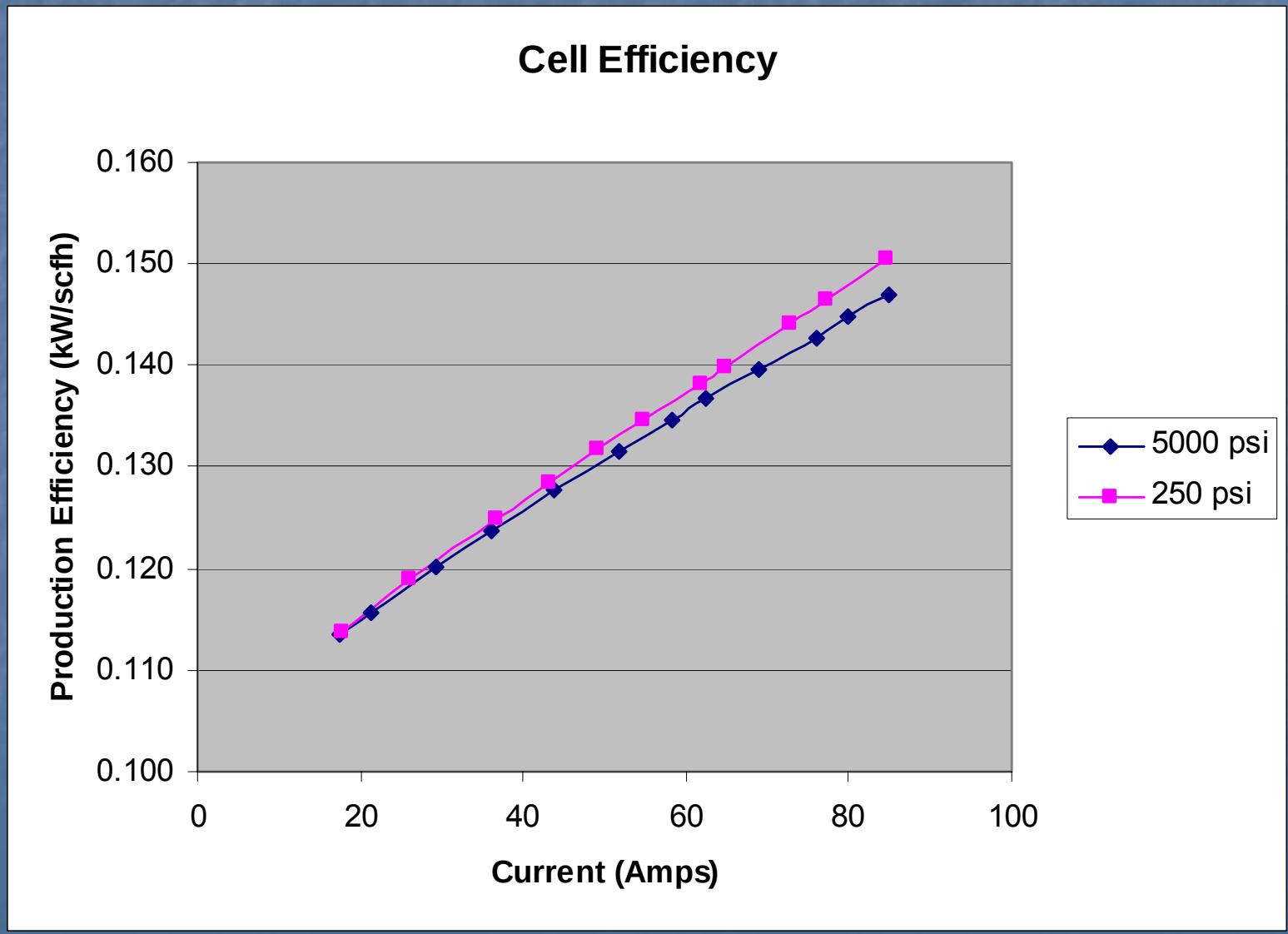

Powered By
Ford
Fuel Cell
WARNING
Milford
Fabricating
Company


HYDROGEN
COMPRESSED


PRAXAIR


ZERO
ZERO EMISSION FUEL CELL BUS
5901
5900
5902
BALLARD Zero-Emission Vehicle

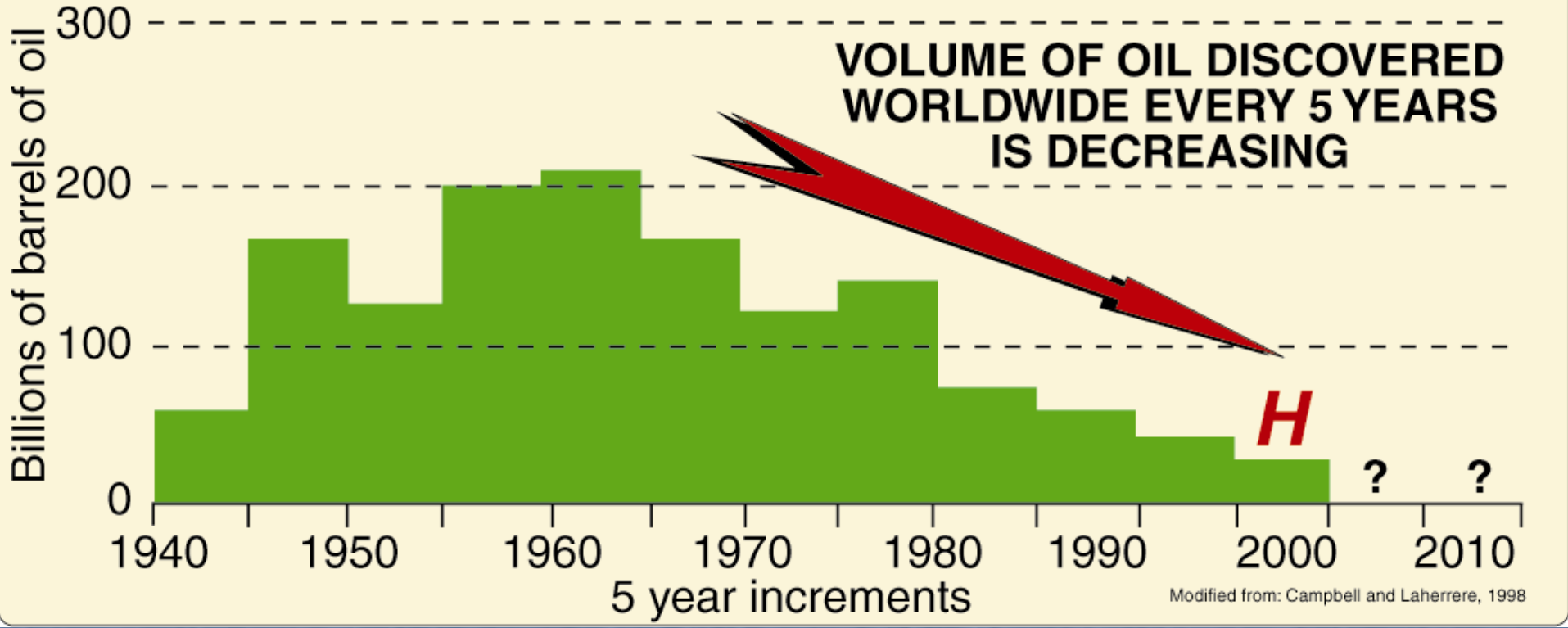
Hydrofiller Production Efficiency



City's Environmental Foundation

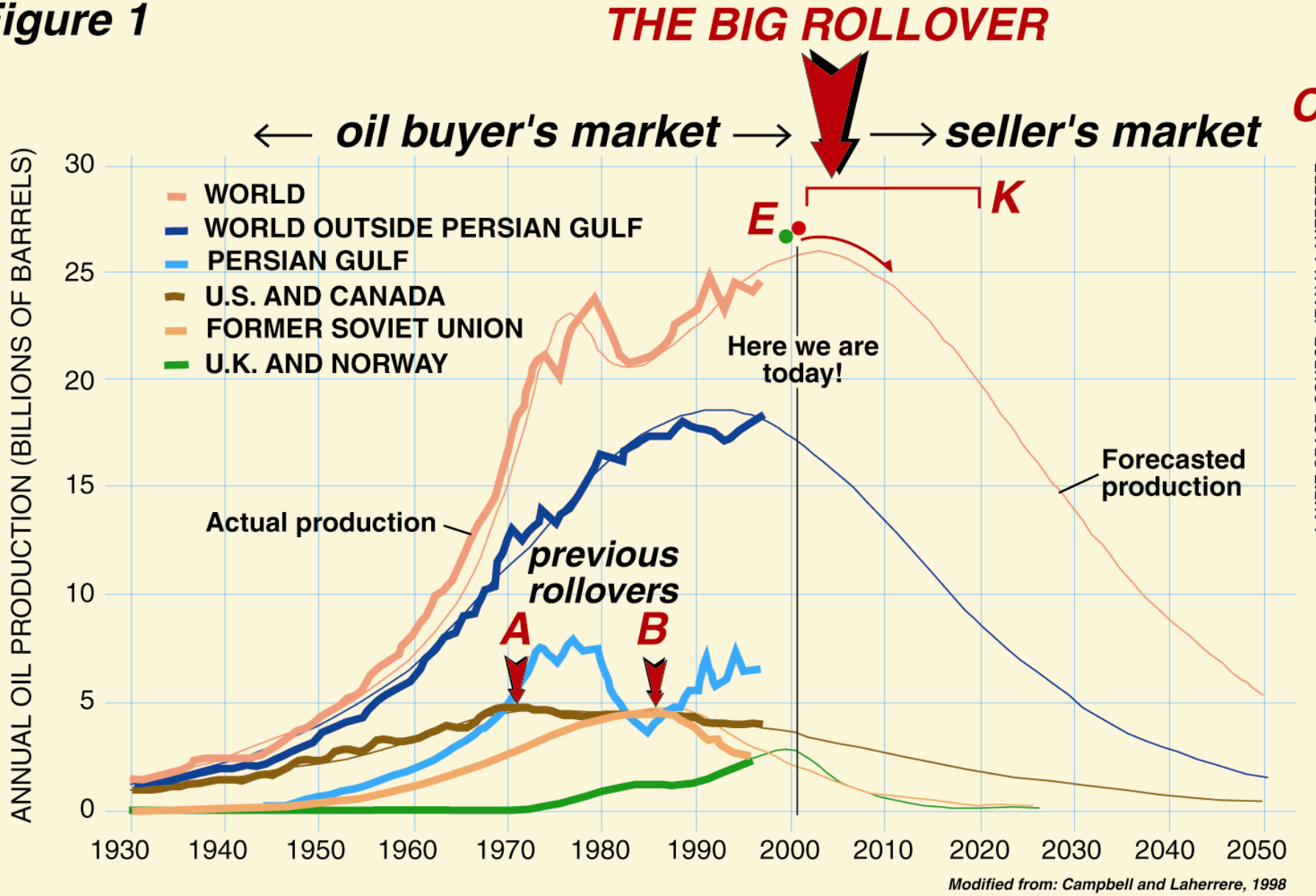
- Municipal electric utility (Wind Power – 1st in State, Electric Energy Supply Policy)
- Member of *Cities for Climate Protection*
  - Local action plan to reduce GHGs
- Alternative fuels vehicle program
  - about 100 vehicles: ~10% of fleet (propane, CNG, hybrids)

Figure 4



http://geopubs.wr.usgs.gov/open-file/of00-320

Figure 1



http://geopubs.wr.usgs.gov/open-file/of00-320